BRUHATH BANGALORE MAHANAGARA PALIKE

Name of the Agency	:	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the Work	:	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Estimate Cost	:	Rs.

QUALITY CONTROL REPORTS TO

Asst. Executive Engineer,
Vidyaranyapura Sub Division,
BBMP, Bangalore.

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QUALITY CONTROL REPORTS FOR

BITUMINOUS MACADAM

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JAS-ANZ BSCIC ISO 9001 REGISTERED

Job No.: CTCE/BBMP/WNo.09/BHS/QB(BM)/2014-15 10.02.2015

TEST REPORT ON DETERMINATION OF BITUMEN CHARACTERISTICS

CLIENT	:	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
AGENCY	:	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
NAME OF THE WORK	:	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
REFERENCE	:	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
SAMPLE ID	:	Bitumen
DATE OF TESTING	:	10.02.2015

The results of the tests conducted on the bitumen sample.

Sl. No	Description	Test Method as per IS	Test Result	Requirement as per IS:73:2013
1	Penetration at 25 ^{0}C, 1/10 mm	IS :1203 -1978 (RA-2009)	87	80 to 100
2	Softening point, ^{0}C	IS :1205 -1978 (RA-2009)	45	Min. 40
3	Ductility at 27^{0}C, cm	IS :1208 -1978 (RA-2009)	100 >	Min. 75
4	Flash Point, ^{0}C	IS :1209 -1978 (RA-2009)	294	Min. 220

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Job No: CTCE/BBMP/WNo.09/BHS/BM/AIV/2014-15 10.02.2015

Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the Work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	10.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	379	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	80	83	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	299	299	
4	Aggregate Impact value = percent fines	21.11	21.73	
	100* (W_2/W_1)%			21.42

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the Work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	10.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	378	382	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	81	84	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	297	298	
4	Aggregate Impact value = percent fines	21.43	21.99	
	100* (W_2/W_1)%			21.71

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Aggregate Impact Value

IS: 2386 Part IV

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the Work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Source / Location	Hotmix Plant, Bangalore
Type of Mix	Bituminous Macadam
Date of Testing	10.02.2015

Sl No.	Details	Trial No. 1	Trial No. 2	Average
1	Total weight of aggregate sample filling the cylindrical measure = W_1 g	381	383	
2	Weight of agregate passing 2.36 mm sieve after the test = W_2 g	84	86	
3	Weight of aggregate retained 2.36 mm sieve after the test = W_3 g	297	297	
4	Aggregate Impact value = percent fines	22.05	22.45	
	100* (W_2/W_1)%			22.25

Comments:

→ Maximum allowable Aggregate Impact value for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Shape.T/2014-15 : 10.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of Work	: Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 10.02.2015

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Flakiness Index = **11.52%**

Elongation Index = **13.64%**

Result : Combined Flakiness & Elongation index **25.16%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

Note:

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Shape.T/2014-15 : 10.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of Work	: Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 10.02.2015

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Flakiness Index = **12.15%**

Elongation Index = **13.48%**

Result : Combined Flakiness & Elongation index **25.63%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Shape.T/2014-15 : 10.02.2015

DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

Client	: **Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	: **Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of Work	: Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	: AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Technical Reference	: IS 2386(Part 1) 1963 (RA 2011)
Type of Mix	: Bituminious Macadum
Date of Testing	: 10.02.2015

Flakiness Index = **11.28%**

Elongation Index = **13.79%**

Result : Combined Flakiness & Elongation index **25.07%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Bituminous Macadam is 30%

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Stripping/2014-15 11.02.2015

Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Type of Mix	Bituminous Macadam
Date of Testing	11.02.2015

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

Observation Number	Stripping, Percentage	Average, Percentage	Average Retained Coating, %
1	2.5	2.67	97.33
2	2.7		
3	2.8		

Comments:

→ Minimum allowable Aggregate retained coating for Bituminous Macadam is 95%

Note:

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Sp_Wa/2014-15 11.02.2015

Specific Gravity And Water Absorption Test

IS: 2386 Part III

Client	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the Work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Source / Location	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	11.02.2015

Sl. No.	Details	Notation	Test Number			Mean Value
			Test 1	Test 2	Test 2	
1	Weight of aggregate suspended in water with the basket	W_1 g	2010	2011	2012	
2	Weight of basket suspended in water	W_2 g	750	750	750	
3	Weight of saturated aggregate in water	$(W_1 - W_2) = W_s$ g	1260	1261	1262	
4	Weight of saturated surface dry aggregate in air	W_3 g	2022	2023	2024	
5	Weight of water equal to the volume of the aggregate	$(W_3 - W_S)$ g	762	762	762	
6	Weight of oven dried aggregate	W_4 g	2004	2006	2008	
7	Specific Gravity	$W_4/(W_3-W_S)$	2.630	2.633	2.635	2.633
8	Apparent Specific gravity	$W_4/(W_4-W_S)$	2.694	2.693	2.692	2.693
9	Water Absorption	$((W_3-W_4)*100)/W_4$	0.90%	0.85%	0.80%	0.85%

Comments:

→ Maximum allowable Aggregate Water absorption value for Bituminous Macadam is 2.0%

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Job No: CTCE/BBMP/WNo.09/BHS/BM/Agg.G/2014-15 11.02.2015

Aggregate Gradation Test

IS : 2386 Part I

Customer	**Asst. Executive Engineer,** Vidyaranyapura Sub Division, BBMP, Bangalore.
Agency	**Mr. B.H. Shivakumar,** Contractor, Bangalore.
Name of the work	Improvements of Nanjappa Circle in Ward No. 09, Vidyaranyapura Sub Division, BBMP, Bangalore.
Reference	AEE/BBMP/VSD/PR/643/2014-15 Dated: 09.02.2015
Sample ID	Hotmix Plant, Bangalore.
Type of Mix	Bituminous Macadam
Date of Testing	11.02.2015

Total Weight of Sample: **5275** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	385	7.30	7.30	92.70	90-100	
13.2	1650	31.28	38.58	61.42	56-88	
4.75	1625	30.81	69.38	30.62	16-36	
2.36	1035	19.62	89.00	11.00	4-19	
0.3	240	4.55	93.55	6.45	2-10	
0.075	125	2.37	95.92	4.08	0-8	

Total Weight of Sample: **5375** gm

SIEVE SIZE, mm	Weight Retained, gm	% Retained	Cummulative % Retained	% Passing	Grade-II As per MORTH	Remarks
26.5	0	0	0	100	100	Gradation satisfies Grade-II MORTH specification
19	415	7.72	7.72	92.28	90-100	
13.2	1485	27.63	35.35	64.65	56-88	
4.75	1735	32.28	67.63	32.37	16-36	
2.36	945	17.58	85.21	14.79	4-19	
0.3	385	7.16	92.37	7.63	2-10	
0.075	90	1.67	94.05	5.95	0-8	

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